Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-19. (Canceled)

20. (New) A process for treating a substrate for forming an oxynitride film on a surface of the substrate, comprising:

providing the substrate having an oxide film thereon; and

irradiating plasma having an electron temperature of 0.5 to 2.0 eV on the oxide film using a mixed gas comprising a rare gas and nitrogen gas to form the oxynitride film, wherein

a nitrogen atom content in the oxynitride film has a distribution such that the maximum value Ns of the nitrogen atom content in the oxynitride film at a surface of the oxynitride film opposite a surface facing the substrate is 10 to 40 atomic percent, and the maximum value Nb of the nitrogen atom content in the oxynitride film at the surface facing the substrate side is 0 to 10 atomic percent.

21. (New) A process according to claim 20, wherein the plasma is irradiated at a temperature of 250 to 500°C and under a pressure of 3 to 260 Pa.

22. (New) A process according to claim 20, wherein the plasma is generated using microwave irradiation by using a plane antenna member having a plurality of slots.

23. (New) A process according to claim 20, wherein the ratio Ns/Nb is 2 or more.

24. (New) A process according to claim 20, wherein the oxide film is formed by plasma processing or thermal oxidation.

25. (New) A process for treating a substrate for forming an oxynitride film on a surface of the substrate, comprising:

providing the substrate having an oxide film thereon; and

irradiating plasma on the oxide film using a mixed gas comprising a rare gas and nitrogen gas to form the oxynitride film, wherein

a nitrogen atom content in the oxynitride film has a distribution such that a ratio Ns/Nb is 2 or more, wherein Ns is the maximum value of the nitrogen atom content in the oxynitride film at a surface opposite a surface facing the substrate, and Nb is the maximum value of the nitrogen atom content in the oxynitride film at the surface facing the substrate.

26. (New) A process according to claim 25, wherein the plasma is irradiated at a temperature of 250 to 500°C and under a pressure of 3 to 260 Pa.

27. (New) A process according to claim 25, wherein the plasma is generated using microwave irradiation by using a plane antenna member having a plurality of slots.

28. (New) A process according to claim 25, wherein the ratio Ns/Nb is 4 or more.

29. (New) A process for forming a gate oxynitride film, comprising:

providing a substrate having an oxide film thereon; and

irradiating plasma having density of $1x10^{10}$ to $5x10^{12}/cm^3$ and an electron temperature of 0.5 to 2.0 eV on the oxide film using a mixed gas comprising a rare gas and nitrogen gas to form the oxynitride film.

30. (New) A process according to claim 29, wherein the plasma is irradiated so that the nitrogen atom content in the gate oxynitride film has a distribution such that the ratio Ns/Nb is 2 or more, wherein Ns is the maximum value of the nitrogen atom content in the oxynitride film at a surface opposite a surface facing the substrate, and Nb is the maximum value of the nitrogen atom content in the oxynitride film at a surface facing the substrate.

31. (New) A process according to claim 29, wherein the plasma is generated using microwave irradiation by using a plane antenna member having a plurality of slots.

32. (New) A process according to claim 29, wherein the gate oxynitride film has a nitrogen atom content distribution such that the maximum value Ns of the nitrogen atom content in the gate oxynitride film at a surface opposite a surface facing the substrate is 10 to 40 atomic percent, and the maximum value Nb of the nitrogen atom content in the gate oxynitride film at the surface facing the substrate is 0 to 10 atomic percent.

33. (New) A process according to claim 29, wherein the plasma is irradiated at a temperature of 250 to 500°C and under a pressure of 3 to 260 Pa.